GENETIC RESOURCES TO DEVELOPING NEW ORNAMENTAL PLANTS

EXEMPLIFIED BY *Hibiscus tiliaceus* L. IN TAHITI

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Suggestion:

- Seed collection and genetic diversity of, Hibiscus tiliaceus L. in Tahiti.
- Development of the new ornamental plant, Hibiscus tiliaceus L. in Tahiti

Comments:

- No page numbers
- plants or trees or woody plants
- seed or capsules, or seed capsules
- Spell out genus once then abbreviate
- Authors should be used only once.
- 5-31 plants were sampled (from table)
- Try to define population as best as possible
- 13 different sampled populations designated (1-13) and 6 visited populations designated (A-F)
- Maybe cite tables in Results and Discussion
- Format table correctly

1

2**Abstract** - should be CAPS.

3Collecting plant ~~material~~ for introduction ~~of new genetic resources~~ into ornamental

4production ~~of~~ greenhouse ~~plants~~ requires that ~~the natural variation~~ in the sampling is

5represented. ~~An investigation~~ was carried out to survey and collect seeds in Tahiti of the

6potential new ornamental plant ~~for greenhouse production,~~ *Hibiscus tiliaceus* L. Seeds

7from 153 individual plants of ~~*H. tiliaceus L.*~~ were collected from 13 different

8populations in ~~4~~ different vegetation zones.

9

10**Key words:** Ecotypes, genetic variation, seed collection, plant collection, plant

11introduction, H. tiliaceus.

12

13**INTRODUCTION**

tab → 14The ornamental horticultural industry's future depends on its ability to change and to

15introduce new products. A ~~glorious~~ history of plant introductions prevails from the ages

16of the seafaring explorations of the past to present, intensive search for "new plants" to

17exploit and enjoy as ornamentals as evidenced by the series of new plant symposia

18conducted under the auspices of International Society of Horticultural Sciences (ISHS)

19~~e.g.~~ (Maloupa, 2000).

20 During the last two hundred years, many exotic species have been ~~brought~~ to

21botanical gardens ~~often by botanists.~~ In ~~the~~ botanical gardens, the plants were basis for

22systematic botany research (Klougart, 1983; Ford-Lloyd & Jackson, 1986). Many of the

23plants have been discovered by horticulturists and brought into cultivation if ~~the plants~~

24~~could grow and had some kind of~~ ornamental value. ~~The~~ species in ~~the~~ botanical gardens

Format for citations: (Klougart, 1993; Ford-Lloyd and Jackson, 1986)

often consist of ~~a~~ very narrow genetic material of one or few genotypes (Klougart, 1987; Guarino et al., 1995); ~~in~~ taxonomic research, botanists are often only interested in type species(~~A type species is~~ an individual plant representative for the species). ~~This is the reason that many cultivated plant species are composed of a restricted genetic material~~ (Ford-Lloyd & Jackson, 1986).

Almost all plant species show geographic variation. Within a species, variations caused by different microclimate and soils are common. These variants, so-called eco-types may have a diverse genetic composition (Holden et al., 1993). ~~To get a representative sample~~ If a representative sample is to be obtained of a species' genetic resources collecting ~~of~~ seeds or plants ~~with~~ a varied habitat~~ion~~ should be ~~done~~ carried out (Guarino et al., 1995).

Most of the ornamental plants, which are produced in greenhouses in Northern Europe, are originally from the tropics or subtropics. Species indigenous ~~in~~ to these regions have a higher growth rate than species from cooler climates. Furthermore, the number of species is higher in the tropics and ~~tropical~~ species are easier adapted to indoor climate (Klougart, 1983). The ~~I~~sland of Tahiti in the South Pacific is a high island of volcanic origin with a tropical climate (Orstrom, 1993) and ~~is geographically variable with various~~ its geography is varied. The variety of soils, and the interplay of the ocean, the mountains produce ~~many different~~ several microclimates, ~~and~~ consequently many different habitats exist. The vegetation can be divided into five vegetation zones: coast, lowland, lower mountain, mountain and valley zone (National Research Council, 1986). Tahiti is a good collecting region because it is a limited area to survey, where plants with genetic ~~variation~~ diversity are expected to exist.

The woody plant *Hibiscus tiliaceus* L. belongs ~~to the family~~ in the family Malváceae and in Tahitian it is called "Purau". The common name in English is sea hibiscus or tree hibiscus. In Tahiti, the species occurs in nature in three varieties: ~~var.~~ *typicus*, ~~var.~~

Introduction of type species is partly to blame for the lack of or restricted genetic material in cultivated plant species (F..., 1986).

henryanus F. Brown and ~~var.~~ *sterilis* F. Brown (Brown, 1935). Other varieties (cultivars) with differently coloured foliage are available in culture (Saquet, 1996). *H~~ibiscus~~ tiliaceus* ~~L.~~ is common to abundant in littoral forests, ~~and~~ mangrove forest margins of atolls and high islands. ~~*Hibiscus tiliaceus* L. var. *typicus* is very common in valleys where the trees make impassable brushwoods with their characteristic branches in all directions.~~ The ~~trees~~ grow from the shore up to 800 m altitude. *H~~ibiscus~~ tiliaceus* ~~L.~~ var. *henryanus* ~~F. Brown~~ grows well in poor, salty soil at the seashore. It is ~~very~~ common by the shore, but ~~it~~ also grows up to ~~800 m altitude~~. *H~~ibiscus~~ tiliaceus* ~~L.~~ var. *sterilis* ~~F. Brown~~ grows on dry slopes, shallow ravines ~~of the upland~~ and in some valleys (Brown, 1935; Saquet, 1996). ~~This~~ variety is often seen in cultivation (Petard, 1986).

The woody plant *H~~ibiscus~~ tiliaceus* ~~L.~~ is closely related to the well-known *H~~ibiscus~~ rosa-sinensis*, which has been in cultivation in greenhouses throughout the world for centuries. The beautiful relation might be a good addition to the assortment of ornamentals. Thus, the purpose of the present investigation was to carry out a survey and collection of the genus *Hibiscus tiliaceus* L. in Tahiti where this species is abundant in various habitats.

MATERIAL AND METHODS

Seed collect~~ion~~ ~~took place~~ by stratified random sampling ~~in populations of *Hibiscus tiliaceus* L.~~ in samples of 10-20 ~~trees~~ per population with a distance of about 100 m between the sampled ~~trees.~~ In locations where ~~trees~~ did not grow in populations, but grew scattered, an area of 2-5 ha was considered as a population and ~~10-15~~ randomly chosen ~~trees were sampled~~. In cases ~~of~~ cultivated ~~trees only planted in a group of few~~, a village was considered ~~as~~ a population and 10-15 randomly chosen trees was sampled. About

1five capsules per tree from different parts of the tree were collected, ~~afterwards the~~

2capsules were stored in paper bags in open air. The seeds were later removed from the

3capsules and cleaned by hand. The seeds were dried for a week in a 7.5 sealed box

4containing 450 g calcium chloride ~~and afterwards storing refrigerated~~ in sealed plastic

5bags.

6

7RESULTS AND DISCUSSION

8Seeds from 153 individual plants were collected from 13 different populations. The

9populations were located in the following vegetation zones: ~~6~~ coast, ~~4~~ lowland and 3

10valley zones as shown in table 1. ~~Further 6~~ locations were visited as shown in table 2, but

11collecting was not done, ~~because of various~~ reasons.

12 ~~In some populations seeds from under 10 individual tress were collected due to~~

13~~the fact that the fruit setting was smaller in April and May compare to March.~~ Birds ~~had~~ which had also contributed to the lack of seed

14often eaten ~~the~~ seeds before they had sufficiently matured ~~to be collected.~~ ~~It~~ was the case

15in population ~~no.~~ 10 and 11 ~~and the visited populations C and E~~. Flowering and seed

16set~~ting~~ was ~~richer~~ in ~~trees~~ at the coast ~~than in the valleys and forests~~ because of different

17varieties growing there and climate conditions. As a result, seeds from more plants have

18been collected in the coastal zone than in the other vegetation zones and therefore more

19seeds of var. *henryanus* ~~F~~.

20 Collecting genetic resources from ~~trees~~ is in many ways different from ~~collecting~~

21~~from~~ herbaceous plants. For example, most ~~trees are not much inbred and~~ show a high

22degree of intra-specific variation ~~and this~~ influences the sampling. ~~To collect~~ material to

23be used in breeding programmes it is recommend collecting seeds from more than 200

24~~trees~~ per population to avoid narrowing of the genetic ~~material~~ by ~~later repeatedly~~

Because fruit set was low in some populations sampling was carried out on less than 10 plants.

selection (FAO Forest Resources Division, 1995), but we found it too laborious to follow this recommendation, and instead we followed the guidelines for collecting for ex situ (italics) conservation or research of hereditary. The goal in these guidelines where the aim is to get a genetic representative sample by collecting collection and then seeds from 10-20 plants per population have to be collected randomly (gather at random) (FAO Forest Resources Division, 1995). The distance between the sampled trees (plants) was kept at about 100 m, which is considered longer than the normal natural dispersion of the seeds. (citation) A general rule by FAO Forest Resources Division (1995) is to keep a distance of 100-200 m between the sampled trees.

In cases where the trees (plants) did not form (distinct) populations, but grew scattered in an area of 2-5 ha, were considered as one population and seeds (capsules) were collected from 10-15 randomly chosen trees (plants) as recommend by Hawkes (1991). Fruits from all parts of the tree were collected because the fruits can have different sources of pollination according to the guidelines by Brown & Marshall (1995).

According to Brown and Marshall (1995) seed (fruit) may have been produced from fertilization events from different sources of pollen; therefore seed was collected from several plant parts.

CONCLUSION

tab → Seeds from 153 individual plants were collected from 13 different populations on Tahiti. The populations were present in the following vegetation zones: 6 coast (coast (6) etc.), 4 lowland and 3 valley zones. (lowland or lower mountain) Most was More seed where collected from more trees (plants) in the coastal zone than in the other vegetation zones. The seeds await further evaluation (A) after germination and growth (seed will be further evaluated.) in a suitable environment.

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(not italics)

pp. 1 — 3
pp 1-3
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ion H.

1Table 1. Results of seed collecting of *Hibiscus tiliaceus* L. in Tahiti.

Population	Collection Date	Collecting Location	Vegetation zone	No. of plants sampled
1	March 9 [a]	Te Maru Ata, Punaaunia	Lower mountain	5
2	March 9	Te Maru Ata, Punaaunia	Lower mountain	5
3	March 10	Punaaunia	Coast	6
4	March 11	Te Maru Ata, Punaaunia	Lower mountain	14
5	March 16	Vallée Punaruu	Valley	10
6	March 17	Maraa	Coast	20
7	March 17	Nairiri	Coast	22
8	March 19	Pointe Faremahora, Teahupoo	Coast	31
9	April 4	Te Maru Ata, Punaaunia	Lower mountain	8
10	April 9	Vallée de Papanoo	Valley	6
11	May 6	Vallée Tuaura, Mahina	Valley	5
12	May 6	Pointe Venus, Mahina	Coast	8
13	May 13	Baie de Taipaia	Coast	13

Fix → (n)

lowland?

2 [a] Footnote year (2005)

Popula.	Date	Location
~~	~~	~~
~~	~~	~~
~~	~~	~~
~~	~~	~~

Table Format

This table is not necessary.

1Table 2. ~~Visited~~ Locations where collecting ~~of~~ seeds ~~were~~ not ~~done~~. was carried out.

Population	Date	Location	Vegetation zone	Reason
A	March 20	Isthme de Taravao	Lower mountain	No access to population
B	March 21	Vallée Vaitepiha, Tautira	Valley	Difficult access
C	May 3	Vallée Tahiria, Mataiea	Valley	No seeds at time of visit
D	May 6	Opearahi, Mahina	Lower mountain	No hibiscus trees
E	May 9	Vallée Papeiha	Valley	Difficult access
F	May 5	Fare Rau Ape	Lower mountain	No seeds at time of visit

2

3

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